REMARKS

Claims 1, 3-28 are pending in the application.

Claims 1, 9-11 and 18-22 have been rejected.

Claims 23-28 have been allowed.

Claims 3-8 and 12-17 were objected to.

Claim 19 has been amended as set forth herein.

Claims 1, 3-28 remain pending in this application.

Reconsideration of the claims is respectfully requested.

I. DRAWINGS

Figures 1 and 2 were objected to by the Examiner as not being designated by a legend such as Prior Art. By the enclosed replacement sheets, the Applicants have amended Figures 1 and 2 to include the legend Prior Art. Accordingly, the Applicants respectfully request that the objection to Figures 1 and 2 be withdrawn.

II. CLAIM REJECTIONS UNDER 35 U.S.C. § 112

Claims 19-21 were rejected under 35 U.S.C. § 112, second paragraph. The Applicants have amended these claims as suggested by the Examiner to more clearly recite that each module is provided with its respective weight. Because this amendment is consistent with how the claim was interpreted by the Examiner for examination purposes, the Applicants respectfully submit that no further search or consideration would be necessitated by this amendment and respectfully request entry of the amendment.

The Applicants respectfully request that the rejection of these claims under 35 U.S.C. § 112, second paragraph, be withdrawn.

III. CLAIM REJECTIONS – DOUBLE PATENTING

Claims 1 and 9 were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 17 of copending Application No.

10/540,791.

The provisional double-patenting rejection of these claims is noted. The Applicants will address this issue at such time as the '791 application issues, and the actual differences between the issued claims and the claims in the present application can be analyzed.

IV. REJECTIONS UNDER 35 U.S.C. § 103

Claims 1, 2, 9-11, and 18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicant's admitted prior art ("APA") in view of Li (U.S. Patent No. 7,130,365) and Petrus (U.S. Patent No. 6,177,906). The rejection is respectfully traversed.

Claim 22 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicant's admitted prior art ("APA") in view of Li (U.S. Patent No. 7,130,365). The rejection is respectfully traversed.

In *ex parte* examination of patent applications, the Patent Office bears the burden of establishing a *prima facie* case of obviousness. MPEP § 2142; *In re Fritch*, 972 F.2d 1260, 1262, 23 U.S.P.Q.2d 1780, 1783 (Fed. Cir. 1992). The initial burden of establishing a *prima facie* basis to deny patentability to a claimed invention is always upon the Patent Office. MPEP § 2142; *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Piasecki*, 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (Fed. Cir. 1984). Only when a *prima facie* case of obviousness is established does the burden shift to the applicant to produce evidence of nonobviousness. MPEP § 2142; *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Rijckaert*, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). If the Patent Office does not produce a *prima facie* case of unpatentability, then without more the applicant is entitled to grant of a patent. *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Grabiak*, 769 F.2d 729, 733, 226 U.S.P.Q. 870, 873 (Fed. Cir. 1985).

A *prima facie* case of obviousness is established when the teachings of the prior art itself suggest the claimed subject matter to a person of ordinary skill in the art. *In re Bell*, 991 F.2d 781, 783, 26 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1993). To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the

references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed invention and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. MPEP § 2142. In making a rejection, the examiner is expected to make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), *viz.*, (1) the scope and content of the prior art; (2) the differences between the prior art and the claims at issue; and (3) the level of ordinary skill in the art. In addition to these factual determinations, the examiner must also provide "some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir 2006) (cited with approval in *KSR Int'l v. Teleflex Inc.*, 127 S. Ct. 1727, 1741, 82 USPQ2d 1385, 1396 (2007)).

The Applicants respectfully submit that the combination of cited references fails to teach or suggest all the claim elements of Claim 1. Specifically, Claim 1 recites, "wherein said baseband processing module provides said control information to said smart antenna processing module according to data outputted from one of the plurality of groups of radio frequency signal processing modules before said smart antenna processing module is enabled."

With regard to this element, the Office Action states that the initialized weight vector of Petrus only passes a single antenna signal, and the actual combining of multiple antenna signals is not enabled until the next converged weight vector. In support of this interpretation, the Office Action cites the following section of Petrus:

> ...When a least squares criterion is used, the general method includes the following steps:
> 1. Initialize the weight vector. For example, use $w_{r,initial}$ =[1 0 0 . . . 0]' where x' denotes the transpose of x. In an improved embodiment, the singular vector of R_{zz} =ZZ^H corresponding to the largest singular value is used. In yet another embodiment, the weight vector from the previous burst is used. As will be described below, one aspect of the present invention includes using a decision directed method after a partial property method is used. In such a case, when implemented in any of the

> embodiments of the present invention, the last obtained weight vector (i.e., using a partial property restoral method) is used;
> 2. Perform a signal copy
> $s(t) = w_r^H z(t)$, (8)
> followed by decimation/interpolation if the samples are originally oversampled (in an alternative, the decimation/interpolation may occur prior to the copy signal operation);
> 3. Estimate timing and frequency offset to produce a signal that has the correct timing and frequency offsets;
> 4. Determine a reference signal $s_{ref}(t)$ by making symbol decisions (i.e., demodulating), such that $s_{ref}(t)$ has the correct bit stream and the same modulation scheme, and the same timing and frequency offsets as the signal transmitted to the receiver from the particular user;
> 5. Computing the weight vector by least squares minimization of over w_r. (Col. 12, lines 5-36.)

Petrus simply discloses applying a least squares criterion to achieve the "best" weights. The Applicants are unable to see how having an initial weight vector of $w_{r,initial} = [1\ 0\ 0\ \ldots\ 0]'$ where x' denotes the transpose of x teaches or suggests that only a single antenna signal passes. Furthermore, the Applicants are unable to find any teaching or suggestion in Petrus that the actual combining of multiple antenna signals is not enabled until the next converged weight vector, particularly when the cited section of Petrus clearly states that a signal copy is performed after the weight vector is initialized.

Figure 6 of Petrus shows both signals from both receiving blocks 122 going into signal copy operation 607, not a single signal from a single receiving block 122 as suggested in the Office Action. Furthermore, Col. 18, lines 18-30 states:

> FIG. 6 shows the block diagram of the preferred embodiment multi-port adaptive smart antenna processing apparatus. In each port, **the oversampled outputs 605 of receivers 122 from the antenna elements 103 are combined in a signal copy operation 607**, initially using an initial weight vector 631-i, i=1, . . . , N_S for the first, . . . , N_Sth port, respectively, these initial weights provided by a weight initializer 621. The resulting copy signal is timing offset corrected by timing offset corrector unit 609 which also decimates/interpolates to produce a set of approximately baud-aligned samples (for the CM method iterations) or substantially baud-aligned samples (for the decision directed method iteration(s)) baud-aligned samples. (Emphasis added by the Applicants.)

Therefore, the resulting copy signal is a **combination** of the oversampled outputs 605 from receivers 122, not a single signal from a single receiver 122. As such, the correct or best weights are based upon a combination of signals from two or more receivers not from data outputted from one of the plurality of groups of radio frequency signal processing modules as suggested by the Office Action.

In distinct contrast, Paragraphs [0048] and [0057] of the Applicants' published application state:

> [0048] Firstly, the smart antenna baseband processing is disabled in SA module 306. At this time SA module can receive signals from single-channel RF signal processing module, i.e. SA module 306 can be regarded as a through path to signals from :o single-channel RF signal processing module. Then baseband physical layer processing module 303 first obtains DwPTS and user-specific midamble of signals inputted from single-channel RF signal processing module after the connection between the mobile phone and base station is established.
>
> [0057] 1. In the above step 1, SA module is disabled at the first beginning, and it starts to work by data-driving only when receiving SA control commands via the data bus in step 2, wherein the SA commands include synchronization information for synchronizing the inputted signals, such as DwPTS, user-specific midamble, signals for enabling SA module and selecting the weight algorithm. That is to say, the synchronization information is obtained before SA module starts to work, therefore SA module can reuse the synchronization function of baseband physical layer processing module 303, and conflicts won't be caused.

The Applicants respectfully submit that the combination of cited references fails to teach or suggest "wherein said baseband processing module provides said control information to said smart antenna processing module according to data outputted from one of the plurality of groups of radio frequency signal processing modules before said smart antenna processing module is enabled."

Thus, the Applicants respectfully that Claim 1 is patentable over the combination of cited references.

Independent Claims 10 and 22 recite limitations analogous to the novel limitations emphasized above in traversing the rejection of Claim 1 and, therefore, also are patentable over the combination of cited references.

Accordingly, the Applicants respectfully request withdrawal of the § 103(a) rejections of

Claims 1, 2, 9-11, 18, and 22.

V. ALLOWABLE SUBJECT MATTER

The Applicants thank the Examiner for allowing Claims 23-28.

VI. CONCLUSION

As a result of the foregoing, the Applicants assert that the remaining Claims in the Application are in condition for allowance, and respectfully request an early allowance of such Claims.

If any issues arise, or if the Examiner has any suggestions for expediting allowance of this Application, the Applicants respectfully invite the Examiner to contact the undersigned at the telephone number indicated below or at ***rmccutcheon@munckcarter.com***.

The Commissioner is hereby authorized to charge any additional fees connected with this communication or credit any overpayment to Deposit Account No. 50-0208.

Respectfully submitted,

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